

Attachment 4. Project Description

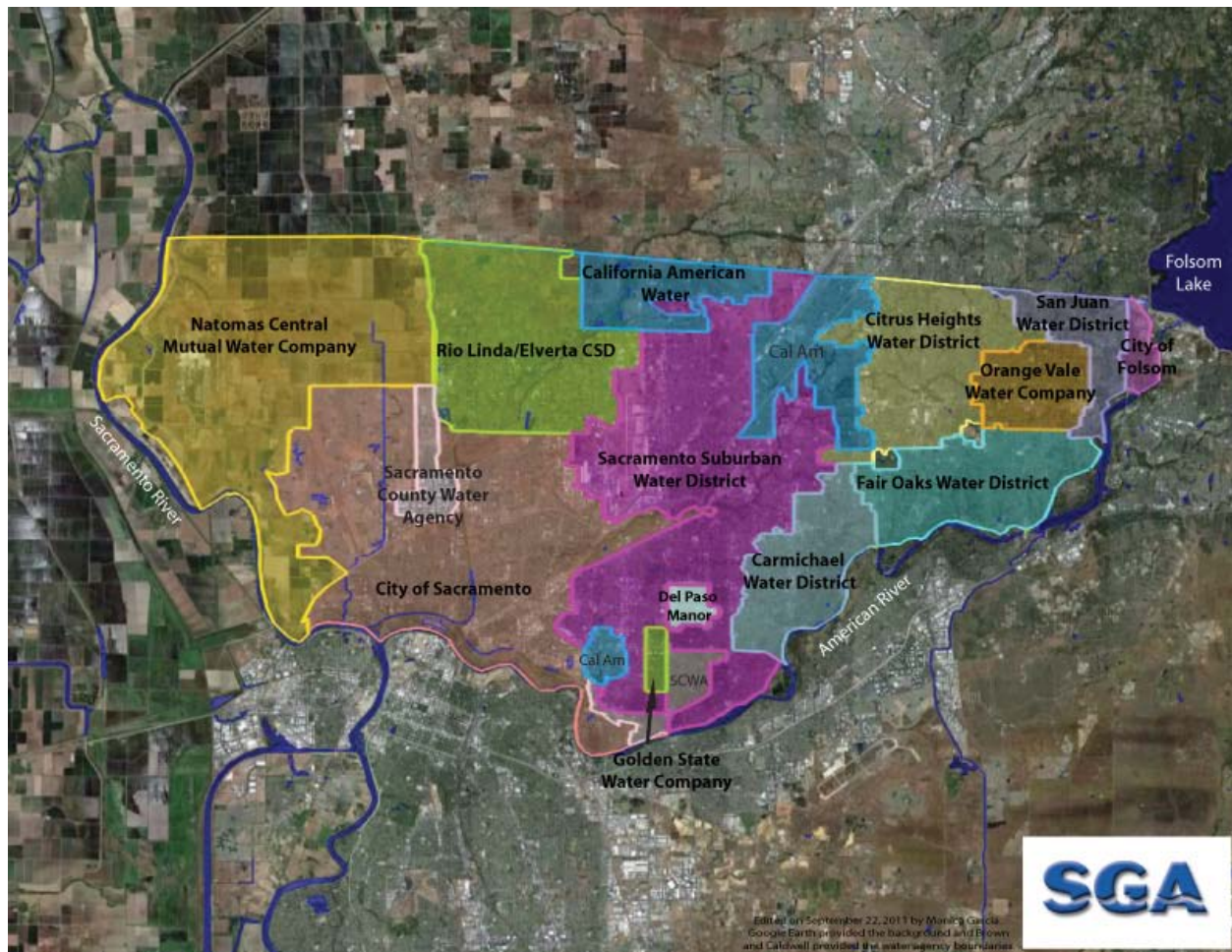
The Sacramento Groundwater Authority (SGA) will perform an assessment and develop tools for the long-term management of a regionally-extensive occurrence of tetrachloroethylene (PCE) contamination in groundwater in northern Sacramento County. Detectable concentrations of PCE have been measured in 11 wells spread over a more than 2 mile-long area, with three wells exceeding the maximum contaminant level (MCL) of 5 micrograms per liter (ug/L). Despite extensive coordination with regulatory agencies, no potential responsible party (PRP) has been found to date.

The primary goal of the study is to minimize the impact of the contaminant on the region's groundwater supply. In support of this goal, the proposed project will better characterize the extent and nature of the contaminant through the construction of strategically located multi-completion monitoring wells and additional water quality sampling of existing and newly constructed monitoring wells. A recently completed groundwater model for the region will be used to develop contaminant transport scenarios to identify the pathway of PCE migration to its current location and to predict where the contaminant may move in the future. The work will help to identify potential sources for the contaminants, and the monitoring wells and model will serve as long-term management tools to mitigate against further impacts from the contaminant.

Background

SGA is a groundwater management agency formed in 1998 to manage the groundwater basin underlying Sacramento County north of the American River (see the **SGA Management Area** figure below). As part of its groundwater management mission, SGA has developed many tools and completed many projects over the years to ensure sustainability of the groundwater basin as a critical element of the historic Sacramento region Water Forum Agreement of 2000 to promote the coequal objectives of water supply for the region through 2030 and protection of the environment of the lower American River.

One of the actions SGA took to more effectively manage the basin was to form a Regional Contamination Issues Committee (RCIC) in April 2004 as a forum for water managers, regulators, and responsible parties to discuss contamination issues and develop collaborative solutions to effectively manage contamination in the basin. The RCIC has met on a continuous basis since that time. Participants in the RCIC have included many of the local water suppliers, the United States Environmental Protection Agency, the Central Valley Regional Water Quality Control Board (RWQCB), the California Department of Toxic Substances Control (DTSC), the California Department of Water Resources (DWR), the California Department of Public Health (DPH), Sacramento County Environmental Management Department (EMD) the United States Air Force Real Property Agency, and Aerojet. It was through the RCIC that SGA was first notified in April 2009 of the concerning presence of high concentrations of PCE in the vicinity of Citrus Heights in northern Sacramento County.



SGA Management Area

Problem Statement

Eleven wells within the California American Water Company (Cal-Am) Lincoln Oaks Service Area (LOSA) and Sacramento Suburban Water District (SSWD) have observed continued and increasing impacts associated with PCE (see the **PCE Study Area** figure below). The first detection of the presence of PCE occurred in the eastern portion of the LOSA dating back to 1989. Eight of the 26 wells in the LOSA have had PCE detections, with three of those exceeding the USEPA maximum contaminant level (MCL) of 5 micrograms per liter (ug/L). Concentrations in the wells have shown increases through time and wells in the western portion of the LOSA, which are downgradient, have had increasing detections through time.

Cal-Am is currently actively involved in a self-funded project to address the immediate impacts to their system and characterize the nature and extent of the PCE within the LOSA. SGA is proposing a complementary study to address the nature and extent and potential contaminant fate and transport of PCE with respect to potential impacts to the broader region. While the SGA study will and Cal-Am studies will ultimately benefit each other and improve overall understanding, they are not directly interdependent and will both provide important results.

Objectives of the Project

There are four primary project objectives to support the goal of the project as described further below.

1. **Better define the presence of PCE around the perimeter of the LOSA.** This is necessary because the spacing of wells outside the last known detection of PCE is typically one mile or greater. The work will help to better understand whether the PCE has migrated into the areas where no data is currently available and then provide an early warning system in cases where PCE is not currently present. Better defining the presence of PCE will be accomplished through construction of new monitoring wells along with sampling of existing monitoring wells (see the **PCE Study Area** figure) as further described under project elements below and the work plan in the next section of the application.
2. **Better define the nature of the presence of the PCE.** The two most common causes of the presence of PCE contamination are from dry cleaning operations and from industrial operations where PCE is a common solvent. PCE at very low concentrations in groundwater is not uncommon in the region. A study completed in 2003 under the State Board's GAMA program found that of 108 wells sampled, primarily in the SGA area, 45 had detections of PCE at the parts per trillion level. It is uncommon, however, to observe PCE in the parts per billion level and over a large (>2 miles) contiguous area (see **PCE Study Area** figure). Existing and new monitoring wells will be sampled for PCE and other VOCs commonly associated with industrial processes to help determine if the PCE is likely sourced by dry cleaning, industrial operations, or a combination of these types of sources.
3. **Better define potential source areas of the PCE.** To effectively manage the groundwater basin with the continued presence of PCE, it would be extremely useful to understand the potential source areas. For example, dry cleaners are expected to phase out the use of PCE over the next decade, so dry cleaner sources may represent a limited threat into the future. Similarly, a past source that is no longer active, or an ongoing source from contaminated soils would dictate different management decisions. Additionally, as discussed above, the concentrations and extent of the PCE contamination could indicate that multiple sources are merging together, possibly due to groundwater production patterns. Using an existing regional groundwater model with a contaminant transport routine, we would be able to add PCE at known discharge locations (based on data from GeoTracker) to identify the most likely source locations based on historic groundwater extraction patterns. This is described more in the project elements below and the work plan in the next section of the application.
4. **Better define where the PCE could go given recent groundwater extraction patterns.** To most effectively mitigate against potential future impacts, it is important to estimate where the PCE could end up in the future. Again, the existing regional model used in conjunction with a contaminant transport routine could be used to identify the most likely future pathways of PCE given planned extractions from the wells within the study area. This is described more in the project elements below and the work plan in the next section of the application. This information is essential to managing groundwater extraction and considering treatment alternatives.

Project Elements

The area of the study is necessarily limited to a buffer around the known detections of PCE as shown in the **PCE Study Area** figure. The area is approximately bounded by Walerga Road on

the west, Madison Avenue on the south, Sunrise Boulevard to the east, and the Sacramento/Placer county line on the north (because the county line is the limit of SGA's management authority). However, we will coordinate with the City of Roseville to identify upgradient issues and potential sources of PCE as part of the study. In addition to reporting tasks associated with the grant, which are described in the work plan section of this application, the project will consist of three primary elements as described briefly below and in detail in the work plan in the following section of this application.

1. **Install additional monitoring wells.** This part of the study will fill in data gaps around the perimeter of some of the highest known PCE concentrations. Two triple-completion monitoring wells will be installed to depths of up to 500 feet. This will help refine knowledge of both the horizontal and vertical location of PCE. The wells will also help better refine information for the contaminant fate and transport modeling described below. These wells have been strategically located to identify the best combination of data gaps along with access to sites for constructing the wells (see **PCE Study Area** figure). One well will be installed at the Cal-Am Roseville Road Water Storage Tank just south of the UP Railyards in Roseville. A second well will be installed at Mesa Verde High School, which is located between two PCE detections in the Cal Am service area but located in the Citrus Heights Water District (CHWD) service area. This site is of particular interest because CHWD has been interested in locating a public supply well at this site, but has been concerned with the Cal-AM PCE detections. The locations have adequate space to accommodate the construction activities. The first site is owned by an SGA member agency. The Mesa Verde site is expected to be available as part of a memorandum of understanding between the CHWD and the San Juan School District.
 2. **Complete additional groundwater quality sampling and analysis.** In addition to the three new monitoring wells to be constructed, there are five other sites within the study with dedicated monitoring wells that will be sampled for the study. The **PCE Study Area** figure shows the existing and proposed monitoring wells with their respective number of completions in the subsurface. In total, there are seven sites that will be monitored with a total of 19 discrete depths to be sampled. Data collected will not only help spatially define the presence of PCE, but will also help define the potential nature of the source of PCE as being from either dry cleaning or other industrial operations. For example, other organic compounds that are currently associated with contamination at the UP Railyards will be analyzed for their presence. This could help define potential pathways of contaminant movement.
 3. **Perform contaminant fate and transport modeling.** With the additional hydrogeologic data collected from the newly constructed monitoring wells, an existing regional MODFLOW-based groundwater model will be refined and an MT3D contaminant transport package will be used to characterize the movement of the contaminant in the subsurface. With the refined model, contaminant transport will be simulated in two primary ways: 1) a simulation of planned operations of wells in the study area over the next 20 years to observe where the known current contaminant would likely migrate under system stresses; and 2) a simulation of where the contaminant could have come from by using the known surface sources of PCE (based on State Board GeoTracker data) to "feed" PCE into the groundwater basin and running the model based on known monthly pumping by well within the study area
-

over the previous 20 years. This groundwater extraction data is currently available in the SGA data management system.

Relation to GWMP

The proposed project is directly related to the primary goal of the 2008 SGA GWMP "to ensure a viable groundwater resource for beneficial uses including agricultural, industrial, and municipal supplies that support that support the Water Forum Agreement's co-equal objectives of providing a reliable and safe water supply and preserving the fishery, wildlife, recreational, and aesthetic values of the lower American River." This goal cannot be met without a sustainable groundwater basin. Additionally, the project is directly supportive of the SGA basin management objective to "maintain or improve groundwater quality in the SGA area to ensure sustainable use of the groundwater basin."

Need for Project

The PCE has already significantly impacted operations in this part of the basin. PCE is a suspected carcinogen with a state and federal MCL of 5 ug/L and a state public health goal (PHG) of 0.06 ug/L. The eleven wells currently identified with a PCE concentration of at least 1 ug/L have a combined production capacity of more than 11,000 gallons per minute. The remaining wells within the study area that are threatened have a combined production of more than 43,000 gallons per minute. These combined wells have a total production capacity of more than 78 million gallons per day (mgd), which is on the scale of a surface water treatment plant capacity serving a city of approximately 100,000 people.

It is critical to understand current sources, extent, and preferential pathways of the contaminant. A significant percentage of the LOSA wells are impacted (more than a third of the production capacity of the LOSA). As other wells are used preferentially downgradient away from the contaminant, this could accelerate the movement of the contaminant further into the Cal-AM service area and to the service areas of SSWD and CHWD creating a domino effect of the system capacities impacted and threatening the sustainability of this part of the basin.

Collaboration

There has already been significant demonstrated collaboration on the project as it has been regularly discussed at the RCIC (as noted above) since 2009. We will continue to use the RCIC quarterly meetings as a collaboration forum to receive stakeholder input on the project. In particular, we will coordinate closely with the Central Valley RWQCB, DTSC, DPH, and Sacramento County EMD as the responsible regulatory bodies in the basin with respect to contamination. Regulatory agency input into how the information may be used to meet their specific regulatory mandates will be a critical part of project implementation. As evidence of ongoing collaboration on the proposed project, a letter from the Central Valley RWQCB is included in the back of this section of the application. Additionally, letters from Cal-Am and CHWD regarding cooperation on monitoring wells are included as attachments in the Work Plan section of this application.

Additional collaboration will regular updates to the SGA Board of directors at bi-monthly meetings. These meetings are publicly noticed and include elected and appointed representatives of each public water supplier, as well as an appointed representative of agriculture and other

independent groundwater users in the SGA area. The project status will also be reported to the Water Forum Successor Effort, an organized effort to continue dialogue among the water, business, environmental and business caucuses in implementation of the Water Forum Agreement.

New Knowledge and Improved Management

The proposed project will add significant new knowledge to our understanding of this regionally-extensive occurrence of PCE. It will fill in data gaps on the location of the PCE and address the nature (dry cleaners vs. other industrial uses) of potential sources. The new monitoring points and updated contaminant transport model will be important tools for understanding the current status of PCE and serve as ongoing management tools as the region confronts this issue. Local water agencies would be able to provide updated operational assumptions to SGA staff to evaluate whether those operations would potentially impact the mobility of the PCE contamination.

Ongoing Use of Project

SGA has been the groundwater management entity in northern Sacramento County since 1998. Throughout this time, SGA has developed, updated, and implemented a comprehensive groundwater management program for the basin. SGA is committed to maintaining the new monitoring wells and adding them to our approved CASGEM monitoring network, so they will be monitored on an ongoing semi-annual basis. Additionally, SGA has maintained an annual budget for water quality analyses, so the wells will continue to be sampled on a recurring basis to observe trends in PCE concentrations and other constituents. This data will be shared with the water suppliers in the basin for their information in determining how to best produce groundwater from the basin in a manner that is sustainable. Finally, SGA will maintain the updated contaminant transport model as part of its ongoing groundwater management responsibility.

Central Valley Regional Water Quality Control Board

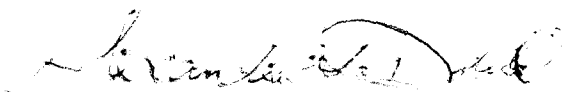
11 July 2012

Mr. Tom Luttermann
California Department of Water Resources
Division of Integrated Regional Water Management
Regional Planning Office
PO Box 942836
Sacramento, CA 94236-0001

**SACRAMENTO GROUNDWATER AUTHORITY LOCAL GROUNDWATER AUTHORITY
ASSISTANCE GRANT APPLICATION 2012, ASSESSMENT AND DEVELOPMENT OF
TOOLS FOR MANAGING PCE CONTAMINATION IN THE NORTH SACRAMENTO COUNTY
GROUNDWATER BASIN**

Staff of the Central Valley Regional Water Quality Control Board (Central Valley Water Board) are members and actively participate on the Sacramento Regional Contamination Issues Committee (RCIC). As the primary participant for the Central Valley Water Board since the conception of the RCIC I am writing to confirm that the Sacramento Groundwater Authority has collaborated with regulatory agencies on the tetrachloroethylene (PCE) contamination in groundwater concerns in northern Sacramento County. The regulatory agencies, including the United States Environmental Protection Agency, Department of Toxic Substances Control and the Central Valley Water Board are concerned with the presence of this contaminant, but until some of the parties responsible for the contamination have been identified, it is difficult to provide a successful outcome given our current legal authority. The study proposed by the Sacramento Groundwater Authority proposed study should be very helpful in developing strategies to mitigate the impacts of the PCE contamination and could provide information needed for regulatory agencies to take further action toward addressing this contaminant. I look forward to continued collaboration on this proposed study through the RCIC.

If you have any questions regarding this matter, please contact me at (916) 464-4625 or at amacdonald@waterboards.ca.gov.



ALEXANDER MACDONALD
Senior Engineer